between rLR in 3TmMRI and the clinical variables, a logistic regression analysis was carried out.
Results: In 14/57 patients (24.56%) a rLR through 3TmMRI was detected. Median pre-SRT PSA was 0.40 ng/ml (interquartile range, 0.30-2.05 ng/ml). The location of the recurrence was perianastomotic in 8/14 patients (57.14%) and retrovesical in 6/14 patients (42.86%). The median size of the local recurrence was 15.2 mm (range, 8.0-46.0 mm). The median apparent diffusion coefficient (ADC) value on DWI was 0.90 mm^2/s (range, 0.35-1.58 mm^2/s) and 6/14 patients (42.85%) presented type 3 pathological captation curves and 3/14 patients (21.42%) presented type 2 enhancement curves in the DCE images. Normal prostate tissue remains were identified in 9/57 patients (15.78%). Pelvic nodal recurrence was evidenced in 4/57 patients (7.01%) and pelvic bone metastasis were found in 4/57 patients (7.01%). 12.90% (4/31) rLR was observed in patients with PSA ≤0.5 ng/ml, vs 38.46% (10/26) for PSA>0.5 ng/ml. The incidence of rLR according to PSA doubling time (PSADT) was 15.% (6/40) for PSADT≤14 months, vs 54.54% (6/11) for PSADT>14 months. The probability of rLR was significantly higher in patients with PSA levels >0.5 ng/ml (adjusted odds ratio (OR): 6.25; 95% confidence interval (CI): 1.27-30.79;p=0.02), or PSA doubling time (PSADT)>14 months (adjusted OR: 7.12; 95% CI:1.40-36.25; p=0.01).
Conclusions: This is the first study to find a significant relationship between the PSADT and the rLR through MRI. Patients that benefit most from conducting a 3TmMRI were those with PSADT>14 months or with pre-SRT PSA >0.5 ng/ml. Its routine use could have significant clinical implications in SRT.

PO-0713

Pathology of CTV of prostate cancer: implications for the dose to the tumor and the gland

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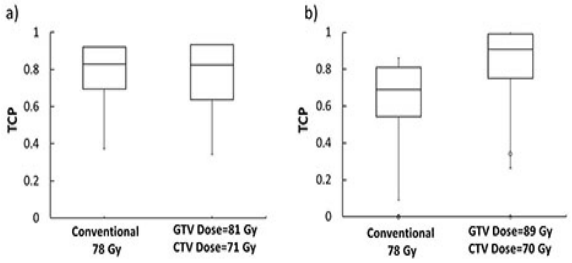
Purpose/Objective: To eradicate all clonogenic cells within the gross tumor volume (GTV) and subclinical malignant disease area (CTV), for most cancers different radiation doses are prescribed to these volumes. This paradigm is however not routinely applied in prostate cancer. The entire gland is typically treated as GTV to a conventional dose of 78 Gy. Here, in higher risk patients, the treatment results are not sufficient, yet associated with mild to severe normal tissue toxicity. Derived from the histopathological properties, we propose to differentiate the dose between GTV and the CTV in the treatment of prostate cancer in order to increase the treatment results as well as reduce the risk of the treatment-related toxicity.

Materials and Methods: Twenty-five radical prostatectomy specimens were studied. The largest tumor focus was defined as index lesion. All index lesions and satellite tumor lesions ≥0.5cm^3 were set as GTV. The CTV was characterized as the whole gland excluding the GTV. Volume, cell density and Gleason score of index and satellite lesions were determined. This information was incorporated into radiobiological modeling of dose differentiation between GTV and CTV for these patients simulating the situation as if they were treated with radiotherapy. The tumor control probability (TCP) was modeled by assuming either a homogeneous or a heterogeneous α according to histopathological properties of tumor foci. For an α/ß of 3, we chose the value for the homogeneous α (α_{hom}) such that 80% TCP was reached in our population with a conventional dose of 78 Gy. The heterogeneous α varied with Gleason grade, keeping the weighted average over all tumors and Gleason grades equal to α_{hom}.

Results:



Multifocal cancer was found in 76% (19/25) of the cases. The CTV of 12 cases of multifocal cancers (12/19) contained advanced pathology of GS 4+3 or 4+4. Compared to the GTV however, the pathology of CTV was on average more favorable. We found α_{hom}=0.17 Gy^{-1} to reach 80% TCP with a conventional dose of 78 Gy. Here, a GTV dose of 81 Gy could be combined with a dose reduction to the CTV to 71 Gy without compromising the TCP in the population (Figure1a). Using a heterogeneous α however, α=0.212, 0.162 and 0.112 Gy^{-1} for Gleason patterns 3, 4 and 5 respectively, a GTV dose of 89 Gy could be combined with a 70 Gy dose to the CTV while maintaining a TCP of 80% in the population (Figure1b).
Conclusions: As subclinical prostate tumor foci may be clinically relevant, these need to be treated as CTV. If a homogeneous radiosensitivity for all tumor foci is considered, dose differentiation between GTV and CTV in the order of 10 Gy may be feasible. Further dose differentiation can be achieved if Gleason grades are related to a heterogeneity in the radiosensitivity of the tumor foci. This may reduce the risk of the treatment-related toxicity without compromising local control. Further studies are needed to determine the effect of heterogeneous radiosensitivity on the response of individual patients to different regimes of radiotherapy.

PO-0714

Prognostic factors for prostate cancer death: baseline symptoms predictive for fatal disease

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